



**End-line Survey Report for
Scaling-up Sustainable Agriculture (SSA) Project:
Lashio – Northern Shan**

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List of Abbreviations and Acronyms

Both WHH+SFHH: Households who are under both WHH and SFHH

DOA: Department of Agriculture

FGD: Focused Group Discussion

FIG: Farmer Interest Group

HDDS: Household Dietary Diversity Score

HH: Households

KII: Key Informant Interview

LDS: Latter-day Saints

MAHFP: Months of Adequate Household Food Provision

SA: Sustainable Agriculture

SFHH: Small Holder Farmers' Households

SSA: Scaling Up Sustainable Agriculture (SSA)

VDRF: Village Development Revolving Fund

VSLA: Village Saving and Loan Group

WASH committee: Water and Sanitation and Hygiene Committee

WHH: Women Headed Households

Executive Summary

In accordance with CARE's global mandate, to achieve positive, long-lasting and equitable social changes for poor communities, CARE Myanmar is working closely with the vulnerable communities in conflict-affected areas across Myanmar to achieve sustainable and inclusive community development. With the specific objective to improve agricultural yield, income, food and nutrition security of smallholder farmers and women-headed households through promoting sustainable agriculture technologies and nutrition and hygiene practices, a resilient livelihood project, namely Scaling Up Sustainable Agriculture (SSA), funded by Latter-day Saints (LDS) Charities, was implemented in Lashio between 2019 and 2020.

As this SSA project is reaching its end, CARE Myanmar has conducted an internal project review using a mixed method, collecting both qualitative and quantitative data. The whole data collection process was led and completed by CARE Myanmar Lashio team. Then, the process was reinforced by an external evaluation consultant to maintain the objectivity of the process and to improve the credibility of the findings as relevant. The findings of the external evaluation highlight the progress against the project's intended objectives by making comparisons between the statuses of the community before and after the project. This report also captures the success of celebrations and lessons for further improvement for informed decision-making and programming for the near future.

A total of 166 households, 123 smallholder farmer households and 43 women-headed households, were sampled in this review across 13 villages under the seven village tracts in Lashio. For the qualitative data, three FGDs with women-headed households, 3 FGDs with smallholder farmers and 14 key informant interviews with the relevant informants, such as the responsible person from Lashio Township Agricultural Department, Village Leader or Administrator and Village Committee members, were conducted.

Though Scaling Up Sustainable Agriculture (SSA) project has a short implementation period, one and a half year, it contributes a lot to the positive outcomes in various aspects. Basically, the project contributed largely to changes in behavior related to the adoption of new agriculture practices, leading to increased production and a slight increase in income. Besides, all of the outcomes related to year-round accessibility of water (for drinking, household utilization and agricultural use) and water treatment practices especially for drinking water were found to improve significantly when compared with the baseline figures. The project also helped people better access improved forms of toilets and handwashing practices. In addition, the project promoted nutrition practices including nutritional diversity and exclusive breastfeeding, etc. The project also promoted women's decision-making roles and enhanced their social positioning status among the households.

Regarding the *agriculture techniques* promoted by the project, in both first and second crops, the adoption of techniques showed significantly high during the end line. No adoption rate dropped from about 50% during the baseline to only 3% during the end line. The figure for those who adopted at least one technique increased nearly two-fold, reflecting more people adopted at least one technique promoted by the project. The most common technique adopted by the HHs during the end line is diversified cropping system (nearly three quarter), followed by using manure to increase soil organic matter (presenting 37%) and crop rotation (13.3%). It can also be assumed that these changes in adoption contributed to increased yield of the crops and income. A double increase in yield of the first crop, a slight increase in yield of the second crop and higher income were observed during the end line. When making a detail analysis of household income by using yield as a proxy indicator, the increase in yield/income has reported among 64% of those who adopted 2 or more SA techniques introduced by project. However, it was still observed that the group bearing the double burden (SFHH and WHH) earned the lowest annual income among the three observed groups of the study. For

getting *seeds* for farming, farmers mainly relied on only one source of input mostly their own seed for the coming season. About one third of them get seed from other farmers. In addition to these two sources, some bought the seeds from TAO or other agricultural input sources.

Regarding food production and *self-sufficiency of the food*, 5 out of 12 food items, i.e., 40% can be relied on the respondents' own production of either farming, fishing or hunting for eating them in the past 24 hours and this covered more than half of their food requirements. The figures significantly increased from the baseline finding which is only 25.9%. The majority of HHs (92.8%) grew home garden on the average land size of 0.56 acre. The average size of land used for home garden showed bigger among SFHH (0.69 acre) than the WHH (0.13 acre). The common vegetables grown were mustard, eggplant, chili/pepper long bean and tomato. The study also shows that the respondents got diverse variety of food from their own production.

Despite a general increase in yield of crops, the *food security* was fluctuated during different months. The respondents reported that April and May in Summer and August, September and October in late Rainy Season were the most difficult months for them. While calculating the average MAHFP score, the result yielded as 10.79 months which is slightly lower than the baseline value of 11.37 months, showing a slight difficulty in food security during the end line.

Upon exploring the membership of the sampled households in *Farmer Interest Groups (FIGs)*, only 8.4% (n=14) reported of their membership. No one from WHH or SFHH involved in FIGs. Though the number is quite low and difficult to conclude statistically, among those who involved in FIGs, majority of them reported a 50% increase in yield of their crops than the baseline value. In addition, 71% of them reported that they received technical information from FIG, and about half received support related to tools and materials. About one-third each said the FIG provided market information and financial support and did collective activities through FIGs.

Concerning the *utilization of the crops* cultivated, more than half of the households grew the main crops for family consumption, while 48% of them sold the products for their income. Similarly, almost 40% of the second crop growers sold their crops. Among people who sold their first crop, more than half (59%) did it individually, whereas about one fifth each sold either collectively or applying both methods. Regarding the market information, the majority of the respondents relied on farmers/neighbors. According to both baseline and end line studies, the effectiveness of the project interventions of promoting market information via FIGs was still questionable and need to be strengthened in similar future projects.

Regarding the access to financial services among the community, 10% less of the respondents in end-line survey relied on *borrowing* money compared with the baseline reflecting the increase in income among the respondents and a slight increase in financial self-sufficiency among the end line respondents. Among those, who took the loans, they mainly took them from mini-grants and less relying on formal loan sources due to accessibility issues. Again, the majority of the people did not have a *saving practice* which was relatively the same as the saving pattern during the baseline.

Regarding the *water sources* for use, the majority of the household access to improved sources such as public tap/standpipe, tube well/borehole, and piped in the dwellings. When making a comparison with the baseline—where about half relied on surface water—, this showed significant improvement. The respondents mainly walked to fetch water and an average time for collecting water during the summer was 11.48±12.8 minutes. Likewise, the accessibility and sufficiency of water for agriculture purposes also showed an increased between the baseline to end-line. The vast majority of the households (90.4%) relied on rainwater for agriculture purpose, while about one-fifth additionally use surface water and irrigated water for watering their crops. The pattern of accessibility to the year-

round water also reflects higher accessibility during the end-line compared with the baseline (54% Vs 30%).

Regarding the *hygienic use of water and safe methods for drinking*, the end line figures present a higher proportion of people adopting boiling before drinking and using a water filter. The figures also reflect that there is a marked decrease in people who do not apply any cleaning methods before drinking (8% in baseline to 1.5% in end line). Despite an increase in positive behavior regarding safe water drinking through boiling, such practice only reflects among half of the WHH and SFHH families, suggesting the importance of strengthening the reach of benefits to those who are relatively more vulnerable among the community.

Similar to the recommended hygiene practice of water, *hand washing practice* after toilet, before eating, before cooking, after handling animals or dirty things, etc. among the community was found to be significantly improved at the time of end line study. Moreover, though, the overall figures on *hygienic feeding of children and hygienic handling of children's poo* reflect better than the baseline, but the end line figure still presents low as it still accounts for 38% each.

For *latrines*, a large majority of the respondents presented as using ventilated improved pit latrines (VIPs) promoted by the project. This was more than three times compared with the baseline figure (86% Vs 25%), again reflecting the effectiveness of the project's latrine activities. Around three-fourth of the toilets are reported as fly-proof and shame-proof, while half are reported as smell-proof. The use of VIP is the highest among WHHs (94%) followed by around 80% each in the rest two groups. In terms of toilet hygiene and cleanliness, more than half clean their toilets at least four times in a month and about one-third clean 1-3 times in the stated timeframe. These resulted in a decline in diarrhea occurrence among respondent households (especially among under-five children) during the end line compared with the baseline (6% Vs 30%). Regardless of the positive findings mentioned above, the toilet sharing pattern is still higher - about one-fourth in overall participants and up to 37.5% among WHH and SFHH, and this also reflects the toilet accessibility issue among these communities.

Upon studying the *household dietary diversity score (HDDS)*, while the baseline figure presented an average of 6.25, the end line presents significantly higher (10.08), reflecting more diverse dietary patterns among the target community. The proportion of people getting scores 6 and above (diverse food groups) increased from 60% during the baseline to 98.8% during the end-line. Again, the nutritional *dietary diversity of infants and children* showed a significant improvement during the end line survey. For example, while the proportion of HHs presenting insufficiency in children's food sources showed about half of the respondents in baseline, the figure dropped eight folds during the end-line. Both presented the satisfactory outcomes of nutrition knowledge and behavioural promotion interventions among the target communities.

As CARE mandates gender equality and women empowerment, this project also mainstreams gender component into its interventions. Due to project's effort in women empowerment and promotion of women's social positioning and household decision-making, the end line figure related to all aspects of household financial decision-making including family expense (46.4%), selling of crops (50%), household purchase (50%), family business and finance (53.6%), managing personal income (57.8%) and family income management (51.8%), by women alone have shown increased compared with the average baseline figure. This presents, the outcome contributed by the project in promoting higher women's social positioning and decision-making within their families.

In general, many of the outcomes have shown improvements when comparing with the baseline, however, many intervention areas—for example, the adoption of agriculture techniques, key nutritional and hygiene practices and diversity of livelihood opportunities and incomes—still show

very high potential for further improvements to achieve sustainable and long-lasting outcomes. In addition, upon making a detailed analysis upon some outcome variables, it shows some *areas for further improvement* in the current project. These are -

- Though, there is an increase in the adoption pattern of techniques promoted by the project, the variety of adoption is still limited, and it reflects the need for further promotion and provision of support to maximize the impact and for achieving sustainable agriculture outcomes.
- Despite a slight increase in income as well as a reduction in borrowing, the general pattern of the income increases and reliance on external financial sources still poses high among the respondents. Especially, among the HHs that are facing double burden (WHH+SFHH), these still present lower income compared with the rest of the two groups (though their income showed slightly higher than the baseline). In addition, the saving practice among the community is very weak.
- When dealing with project promoted community-based organizations, though there is a slight increase in the involvement of people into these groups such as FIGs and WASH committees during end line, a general participation level showed less significant by seeing that almost half of the respondents do not involve in any of the groups yet. Especially, there is a lack of involvement of more vulnerable HHs (WHH+SFHHs) into FIGs.
- Though the average trends of outcomes during the end line show positive among the whole survey respondents, there is a slight variation in the distribution of results among different groups depending on the vulnerability. For example, for the HHs under the double vulnerable category (both WHH+SFHH), they showed a lower level of income, lower latrine ownership, and changes in some hygiene behaviors, and a lower level of participation on the village-based organizations.

However, given improvements against the baseline in all aspects, there is a very high potential for the project to attain its highest potential—including achievement of inclusive and equitable benefits to the community— if there is any valuable opportunity to continue the project through an extension. In addition, the participation level, function and capacity of the community-based organizations promoted by the project requires ongoing support and strengthening to achieve sustainable changes and development in the community. These factors highlight not only as limitations of the project implementation but also serve as the window opportunity to achieve sustainable development outcomes among the target community.

Introduction

In shaping and contributing to CARE's global mandate of achieving positive, long-lasting, and equitable social changes for poor communities around the world, CARE Myanmar has been endeavoring to achieve sustainable and inclusive community development outcomes in Myanmar through working closely with the vulnerable communities in the conflict-affected areas including Northern Shan. In particular, the target area for the project, Lasio township, is a place characterized by long-standing and active conflict between ethnic armed groups and Tamattaw and presents as one of the townships with the highest poverty rate in the country¹. Along with conflict and poverty, other issues vis-à-vis market information, the efficiency of government services, food security, drug use, and so forth deepen the vulnerability of the local community in the area—especially in villages with a long history of conflict and hard-to-reached.

By using its extensive experience in Northern Shan and using outcomes from previous relevant projects as the foundation, CARE Myanmar has implemented a one and half year project, Scaling Up Sustainable Agriculture (SSA) in Lasio between 2019 to 2020. This 275,000 USD project, funded by Latter-day Saints (LDS) Charities covers 13 vulnerable villages that reached estimated beneficiaries of 589 households with more than 2500 population (with indirect beneficiaries estimated as 5000 people in the area). The project aims to improve agricultural yield, income, food and nutrition security of smallholder farmers and women-headed households through promoting sustainable agriculture technologies and nutrition and hygiene practices. The project has four main intended outcomes...

- Outcome 1: Increased farmers' adoption of sustainable agriculture technologies and practices
- Outcome 2: Increased smallholder farmers' production levels and income through improved access to markets, financial services and water
- Outcome 3: Improved hygiene and nutritional outcomes through increasing women's access, ownership and control of productive resources and sanitation facilities
- Outcome 4: Improved internal and external program learning

Background

As the project is reaching its end line, CARE Myanmar has conducted an internal end line project assessment through collecting both Quantitative and Qualitative data during late 2020. This exercise also resonates with the learning mandate—i.e. Outcome 4—stated in CARE Myanmar's project proposal. This internal assessment data is reinforced by a review and thorough analysis by an external evaluation consultant to maintain the objectivity of the process and to improve the credibility of the findings as relevant. The specific objectives of this consultancy are...

- To analyze the internally collected quantitative and qualitative data for end of project evaluation
- To assess the project's achievements and performance against the baseline information of each outcome
- To identify lessons learned and recommendations to improve future programming
- To produce an evaluation report for donor accountability and internal learning purposes

Therefore, this assignment pays attention to elaborate more about the SSA project's outcomes, success, and lessons especially on three major community intervention-related objectives, through objectively analyzing the internally collected end line review data. The final output is in the form of an evaluation report for donor accountability and internal learning purposes.

¹ Integrated Household Living Conditions Survey in Myanmar: Poverty Profile 2009-10, 2010, www.mm.undp.org. and CARE's proposal for Latter-day Saint Charities

This report outlines the end of project findings that reflect the progress against its intended objectives stated above and presents the facts and figures comparing with the baseline assessment conducted by an independent review team in March 2020. This report will also document success for celebrations and highlights lessons for further improvement and informing program design in future projects.

Methodology

For the purpose of this assessment, Mixed-method, incorporating both quantitative household survey and qualitative interviews, Key Informant Interviews (KII), and Focused Group Discussion (FGD) was used as the overall methodology. As CARE Myanmar has designed the whole methodological framework of the assessment starting from tools (questionnaire) development, sampling, data collection, and management process, the primary data collected by CARE Lasio will be utilized as a major data source to conduct detailed data analysis and reporting.

Sampling

Quantitative survey: In terms of Quantitative survey, a total of 166 households—these include 123 smallholder farmer households and 43 women-headed households (26% of the total sample HHS)—were selected across 13 villages under the seven village tracts in Lasio through applying probabilistic sampling method by CARE Myanmar M&E team in collaboration with the field team. In comparison with the baseline sampling, though the end line survey collection covers a relatively lesser number of respondents (195 Vs 166), the proportion of women headed household involvement shows significantly increased (from 15% to 22% during the end line), which represents getting more vulnerable people’s voices in the EoP study. In addition, 6% of the households that are under both categories (WHH and SFHH), representing the double vulnerability, are included as the respondents in the end line.

Qualitative interviews: For the qualitative interviews, FGDs and KIIs were conducted with different respondent groups such as women-headed households, smallholder farmers, township agriculture department, village leaders, and village committee members. In total, six FGDs with women-headed households and smallholder farmers were conducted. These interviews were complemented by 14 key informant interviews with other respondent groups.

Table 1: Number of FGDs and KIIs conducted during the end line assessment

FGD	KII (SGD)
3 FGD (Women headed household)	1 (Lashio Township Agriculture Department)
3 FGD (Smallholder farmer household)	13 KII/SGD with Village head/Administration and village committee members
6 FGD	14 KII

Data Analysis

For Quantitative data analysis, the process includes data error checking, descriptive data analysis plus incorporating some forms of relevant inferential analysis for a few key outcome variables of the project’s interest. The data analysis process was done by using SPSS software along with MS Excel for data visualization and presentation. As relevant, the analysis outputs from Quantitative data were triangulated and strengthened by reviewing relevant internal qualitative data sources, KII and FGD outputs, and project M&E data.

During data analysis, a comparison of outcome variables between different groups with demographic variation (e.g. male Vs female, economically better off Vs poor, educated Vs uneducated, etc.) and

with the relevant baseline data from 2020 March Baseline Study Report was made to identify variation between groups regarding project outcomes and impact.

For Qualitative data, through proper reviewing of the field data transcripts from KIIs and FGDs, the data were analyzed by using the constant comparison method. A cross triangulation between different data sources was made to improve data validation and to generate better quality interpretation. The qualitative data becomes a basis for documenting success stories or significant change stories reflecting project outcomes and lessons for improvement.

Calculation of Months of Adequate Household Food Provision (MAHFP)

As presented in the baseline report, for measurement of household food access, the indicator of Months of Adequate Household Food Provisioning (MAHFP) (Bilinsky and Swindale, 2010) will be used and it is calculated as follows: To get the MAHFP of a HH, the HH sample was asked whether the HH had any food insufficiency in last 12 months. Twelve month was coded as A, B, C, D, E, F, G, H, I, J, K, and L. If no food insufficiency for HH reported in a particular month, it was marked as zero (0) for that month, if the food insufficiency for that month presented, the score was one (1). After 12 months were asked, the MAFHP of a HH = 12 - (1+1+0+0+0+0+0+0+0+0+0) or 10 months (12-2).

Study limitations

- Short project duration and delayed baseline: The project duration is very short, and the baseline was conducted during early 2020. There is less than one-year gap between baseline and end line survey implementation timing, there is limitation in measuring bigger outcomes such as social changes due to project effort. However, as the project was based on the prior foundational knowledge and experience of working with the same and similar target area including villages, the effort exerted by the project may result synergistic and efficient results
- COVID related challenges: The restrictions due to the global health pandemic caused by Covid-19, compounded the pre-existing limitations of a normal survey. Because of restrictions to access to villages and movement limitations, the timing for the survey data collection was delayed and it in turn results the delayed in the overall process of evaluation. More, the impact of COVID also has extended on field-based interventions such as extension services and community mobilizations due to Government's restricted rules and policies on people's gathering, movement restrictions, etc.
- Limited chance for interactive involvement and survey management by the consultant: The study was mainly an internal evaluation exercise, where the major components of the survey process including planning, designing, field data collection and validation were managed internally by CARE Myanmar. The consultant utilized the data and conduct analysis and reporting process to ensure the objective interpretation of the results as much as possible. However, given the nature of exercise, which was mainly internal, it may have somewhat limitations related to objectivity of the survey.

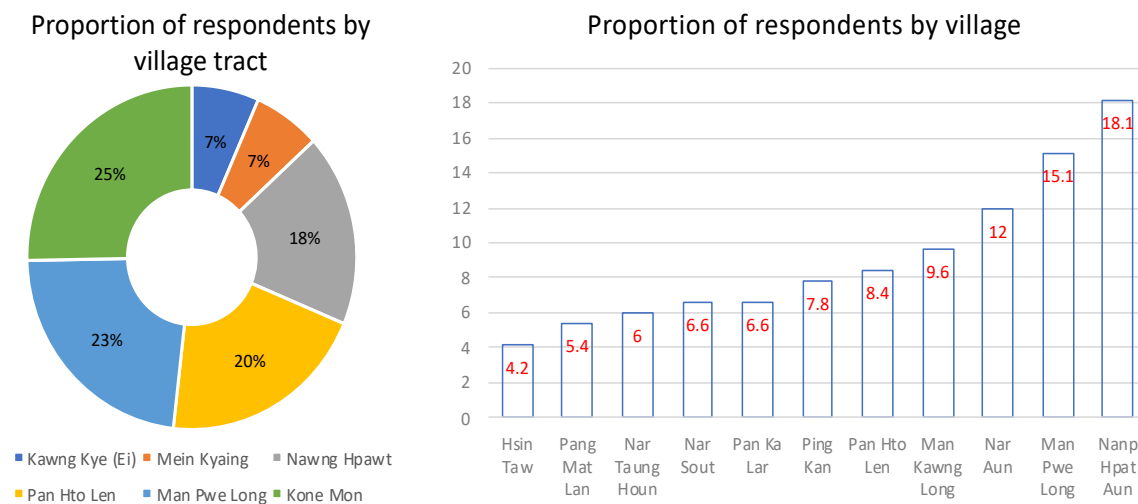
Findings and Discussions

Demographic Summary

As presented in the sampling section, although both end line and baseline studies target mainly on vulnerable people's voices and included respondents from Small Holder Households (SHH) and Women Headed Households (WHH), the end line survey brought slightly larger proportion of the WHH (15% Vs 26%). However, similar to the sampled population from the baseline, a slightly more than half of the end line respondents (56%) are the household heads. Among the total women headed households, n 43 (26%), 5% (n 8) of them represents households showing intersecting vulnerabilities of owning less than 5 acres of land for farming. The figures 1, below present the proportion of

respondents from different village tracts and villages under project area who involved during the end line survey. As presented, the two village tracts, Kone Mon, and Man Pwe Long contributed about half of the total respondent during the end line survey.

Figure 1: The proportion of respondents by villages and village tracts



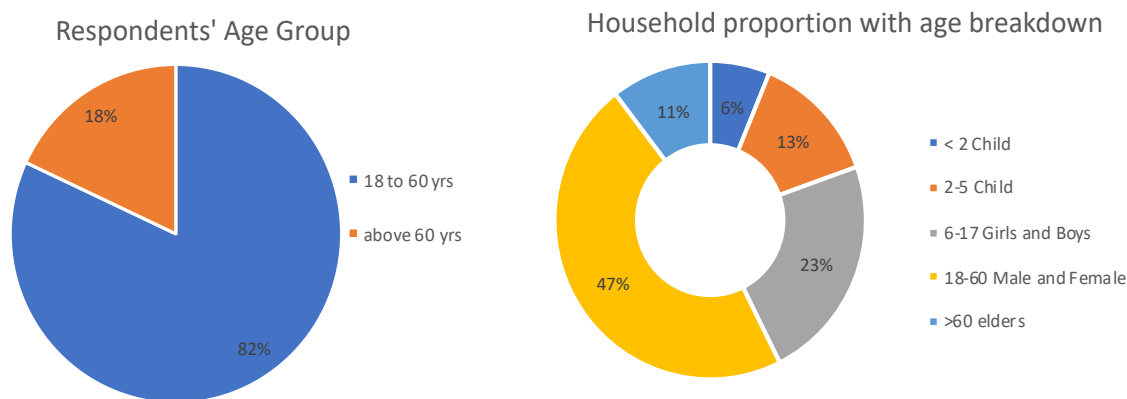
In terms of the household members, more than half of the respondents reported as having 4 to 6 family members in their households, while a similar figure of about one fifth each reported as having 1-3 family members or more than 6 members. With regards to the respondents' sex group, about one-third are female respondents resonating the similar proportion of respondents from female headed households. With regards to the respondents' age, while the mean age of respondents from WHH and from households with double vulnerability (WHH+SFHH) are 51.31 and 47.12 respectively (relatively similar), the mean from SHH respondents shows slightly younger (44). (See the table below.)

Table 2: Summary statistics of age variance between different respondent groups

Respondent's Age (Completed Age)	Women headed household (WHH)	Smallholder farmer household (SHH)	Both WHH &SHH
Mean	51.31	44	47.12
Std. Deviation	12.36	14.72	9.59
Minimum	18.00	19.00	34.00
Maximum	70.00	80.00	63.00

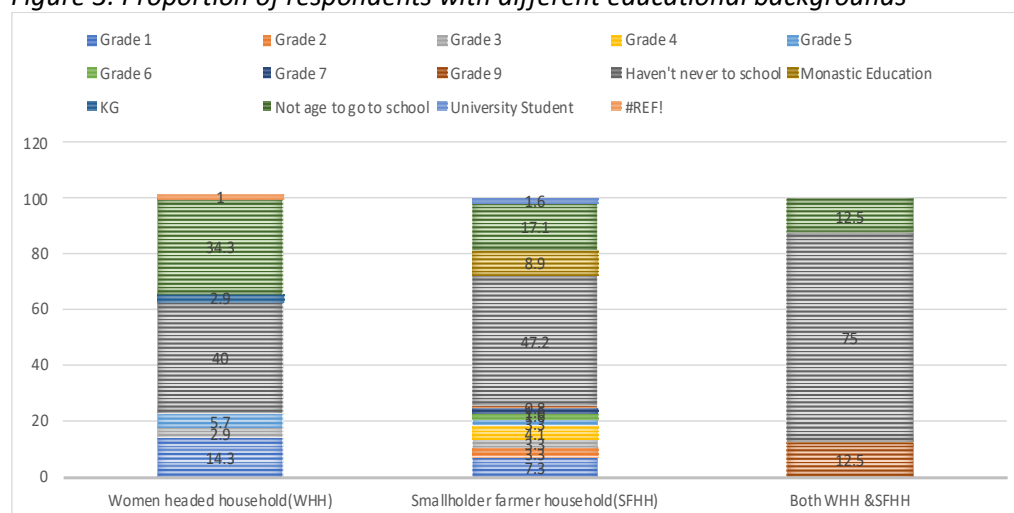
For the age group of the respondents, only one forth are older than 60 years, while the rest represents young to middle age ranging from 18 to 60 years. Among different age group of the respondents, about one fifth of them from each of WHH and SHH represent elder respondents of >60 years. In addition, while half of the respondents (47%) reported that their family comprises of 1-5 family members with the age range between 18-60, only 10% reported the presence of 1-2 elders in their household. About one forth reported the presence of girls and boys ages between 6-17 years, likewise, one-fifth reported that their house is resided by 2-5 years old children (see the figure 2 below).

Figure 2: The proportion of respondents by age groups and into age breakdown



Regarding the educational status of the respondents, about half of the total respondents (47%) stated that they have never attended the school. Likewise, the proportion of people who have attended primary (Grade 1 to 6), primary equivalent (monastic) and below (KG) represents about one third (29%). In contrast, the respondents those completed lower secondary (Grade 7-9) and above (including university level) presents only 3%, which shows generally lower education level of the project’s target community. Among illiterates, households with double vulnerability (both WHH and SFHH) present highest proportion (75%) compared with the other two groups. (see the figure 3 below).

Figure 3: Proportion of respondents with different educational backgrounds



Among households, 95% has own farmland of various sizes. Regarding the detailed analysis on land ownership, it ranges from 0.5 (min) to 13 acres (max), however, almost half (43%) of the households own equal to or lesser than 3 acres of land, while another half (52.5%) own 4-5 acres of land. Those who own bigger than 5 acres account for only 4% of the total respondents and these are coming from WHH survey respondents. (see the table 3 below).

Table 3: Land areas owned by households against different respondent categories

Land areas owned by households	Women headed household (WHH) %	Smallholder farmer household (SFHH) %	Both WHH & SFHH %
0.5	2.9		
1	14.3	6.5	
1.2	2.9		

1.5	2.9	0.8	
2	2.9	17.9	
3	14.3	19.5	12.5
4	14.3	14.6	25
5	28.6	35.7	62.5
6	2.9		
10	5.7	0.8	

Detailed findings against each project components

Objective: improve yields, income, nutritional security of smallholder farmers via adoption of sustainable agricultural technology and practices

Percentage in increased yield of crop

Almost all respondents (99%) grow some kind of crop as their primary crop. Among different crops, paddy and corn (maize) present larger popularity than other crops. While paddy is grown by more than half (59%) as the first main crop, 38% grow corn as their primary crop. In terms of the size of paddy farming, like the baseline figure, more than 90% grows it for not more than 3 acres. Likewise, the majority of the corn growers (86%) also cultivate the crop on not more than 3 acres of land. The growing pattern of other crops such as bean, sesame, niger, and groundnut can be presented as rudimentary (2%) across the community.

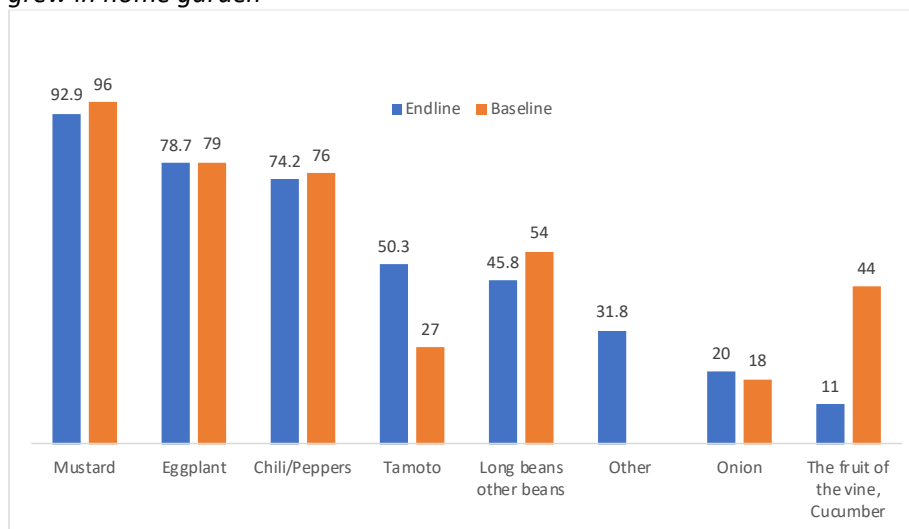
While interpreting the yield, more than half (53%) reported that the yield of their first crop has increased compared with the last year, which is a doubled increase from the baseline figure 24.4%. On the other hand, people who reported equal to or lesser than last year still account for about 20% each. In average, while people who grow rice in low land reported the yield of about 40 tin/ acre, the yield from up land was estimated as 15 tin/ acre according to the Interviews with the farmers. In comparison with the rest two groups, households that are fallen under both WHH and SFHH categories reported higher proportion of the decline in last year yield (around 20% each versus 38%). Among first crop growers, almost half (48%) sell their product for their income, while the rest mainly rely the product for household consumption. Among people who sold their first crop, more than half (59%) did it individually, whereas about one fifth each sold either collectively or applying both methods. In selling the products, people mainly rely on brokers (more than half rely on village-based brokers and about 35% rely on town-based ones).

For the second crop, about three quarter of the respondents grow some form of crop. Although corn (maize) is reported as the second crop by about half of the respondents, paddy still represent large proportion (36%) of the total responses, which signifies the importance of paddy as a major crop for the community. For the second crop, about half (47%) reported increased yield of their crops compared with their last year figure, while about one fourth each reported the same or declined yield. But on the detailed look, both WHH and WHH+SFHH groups present higher proportion of positive yields (>50% each) compared with SFHH households (45%). Among the second crop growers, 39.2% sold their products. In doing so they sell mainly to the town-based brokers (67%) followed by selling to village-based brokers (33.8%).

Based on discussion with community members, compared with SFHHs, Women Headed Households (WHHs) are facing difficulties in doing farming business due to lack of human resource for cultivation, limited time to work on farming business as they have children to be taken care of, and faced investment cost issues due to financial hardship. In addition, during this year, people faced problem with selling outside the village due to COVID-19 restrictions and it effected their income.

Like the baseline figure, the majority of HHs (92.8%) grew home garden on the average land size of 0.56 (min 0.02 to max 3) acre. The average size of land used for growing home garden shows bigger among SFHH (0.69 acre) than the WHH (0.13 acre). The most common types of vegetable for home garden are mustard, eggplant, chili/pepper long bean and tomato. While almost all the home garden growers grew mustard, about three quarter each grew eggplant and Chili/pepper respectively. For long bean, it was grown by about half of the respondents. These four crops resonate with the baseline figure as presented below. However, for tomato, it shows two times increased in end line in comparison with the baseline (27% vs 50.3%). In contrary, the fruit of vine/ cucumber was grown 4 times higher during the baseline than the end line, reasoning the seasonal variation in growth pattern of some vegetables. (See the figure 4 below)

Figure 4: Percent comparison between baseline and end line regarding different types of vegetables grew in home garden



Percentage of income from crop

The average amount of income for the last 12 months from the first main crop was 326,446 MMK (range from 0 income to 9,000,000 MMK), while for the second main crop, the annual income presents 157,870 MMK. This results the average total income from both main crops (first and second crops) as 667,392 MMK which is 179072 Ks higher than the baseline income of 488,319 MMK from crop selling.

In conducting a detailed analysis, it is interesting to see that a relatively higher average annual income from selling crops (first and second) is seen among SFHH (667391.7 MMK) which is then followed by WHH (615274.7 MMK) and households with double burden of both factors (589654.9 MMK), presenting the vulnerability of the last category of the response group.

Percentage of HH improved access to food through food production

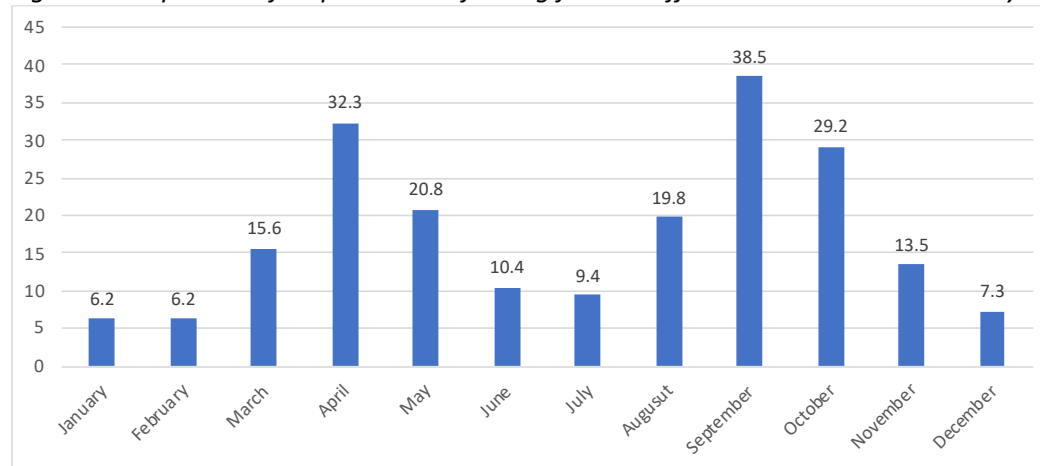
During the baseline, it was reported that one-fourth (25.9%) of the food items can be relied on the respondents' own production of either farming, fishing or hunting for eating them in last 24 hours. In the end line survey, the figure increased to 40% (5 out of 12 food items are reported as produced mainly by the respondents' themselves and covers more than half of their food requirement for respective food items). These items are Cereals, Roots/Tubers/Potatoes etc., Pulses/Legumes/Nuts, Vegetables/Leaves and Fruits. For other items, such as meat, fish, milk and dairy products, eggs, sugar/honey, oil, and condiments more than three-quarter of people rely on shops.

Percentage of HH having moderate hunger and severe hunger

Despite a general increase in yield of crops, the food security was fluctuated during different months and shows April, May, August, September and October as the most insecure or difficult months (see

the figure 5 below). In terms of counting number of months of food insufficiency, while about half (42%) stated that they do not face such difficulty throughout the year, about a little more than half (55.4%) said they faced somewhat difficulties in about 1-4 months of a year. A very small proportion of 1.2% (n2) each comes from WHH and WHH+SFHH. To calculate the average MAHFP score for 166 HH sample, the MAHFP of each HH was summed up for 166 HH, then the result was divided by 166 (total number of HH sample). The result showed that the average MAHFP of the HH sample was 10.79 months which is slightly lower than the baseline value of 11.37 months, showing a slight difficulty in food security during the end line.

Figure 5: Proportion of respondents reflecting food insufficient months over the last year



Outcome 1: Increased farmers' adoption of sustainable agriculture technologies and practices

1.1. Percentage of HH adopt or use at least one SA technology or practice

The project promotes eight major techniques for better and sustainable crop production as 1) diversified cropping systems; 2) crop rotation to improve soil structure; 3) use of cover crops; 4) integrated pests management; 5) use of buffalo manure to increase soil organic matter, 6) use of legumes, such as groundnut and soybean by leaving the remaining straw (dry stem) after harvesting to boost soil nitrogen, 7) improved storage of crops and seeds, and 8) soil and water conservation practices to minimize erosion. For the first main crop, while nearly half of the respondents did not apply none of the techniques listed above during the baseline, the figure drops to 3% during the end line period. The most common technique adopted by the HHs during the end line is diversified cropping system (nearly three quarter), followed by using manure to increase soil organic matter (presenting 37%) and crop rotation (13.3%). The rest of practices show less common among the households (presenting less than 10% each), however, these even reflect larger adoption pattern during the end line when comparing with the baseline figures. (see the figure 6 below)

Similar to the first main crop, the technique adoption pattern for the second crop present significantly higher during the end line comparing with the baseline where at least one third present zero adoption to these practices. During the end line there are only 3% of respondent who showed zero adoption to techniques (at least ten-fold decrease in zero adoption rate). The most common techniques adopted by respondents are diversified cropping system and crop rotation technique. (See the figure 7 below)

Figure 6: Proportion of respondents showing adoption pattern of each technique for first crop (comparison between baseline and end line)

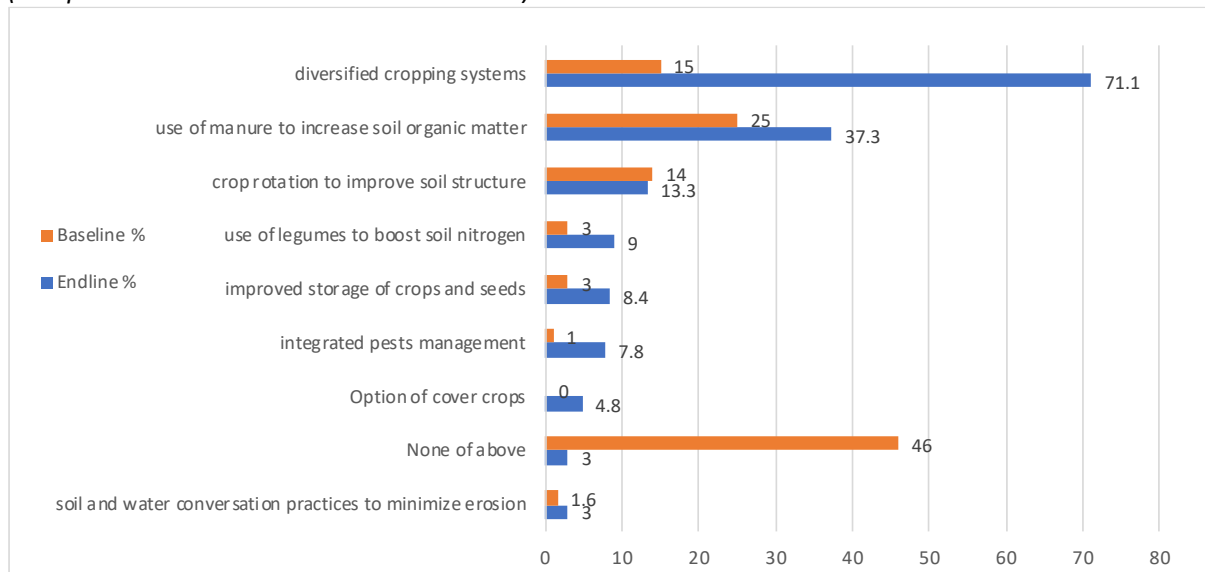
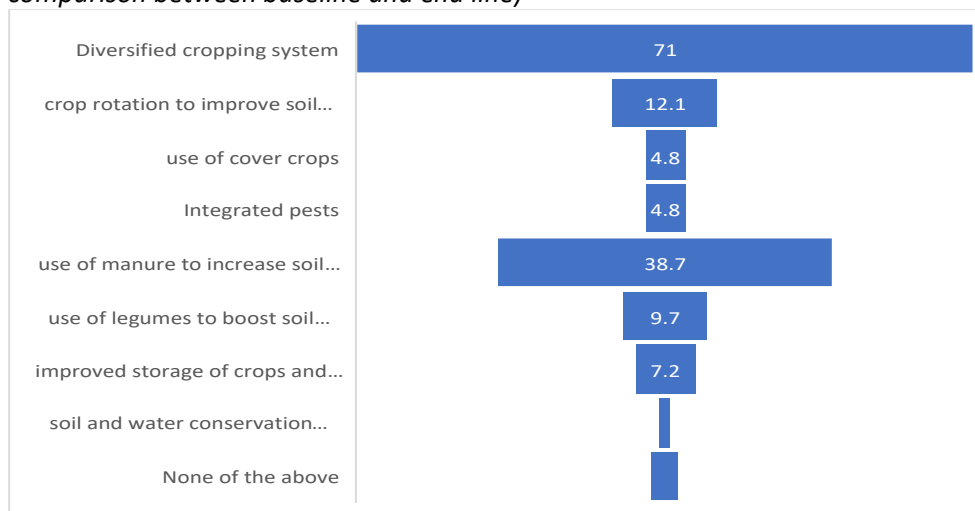


Figure 7: Proportion of respondent households showing technique adoption for second crop (a comparison between baseline and end line)



1.2. Number of new technologies/techniques adopted by farmers with rates of adoption

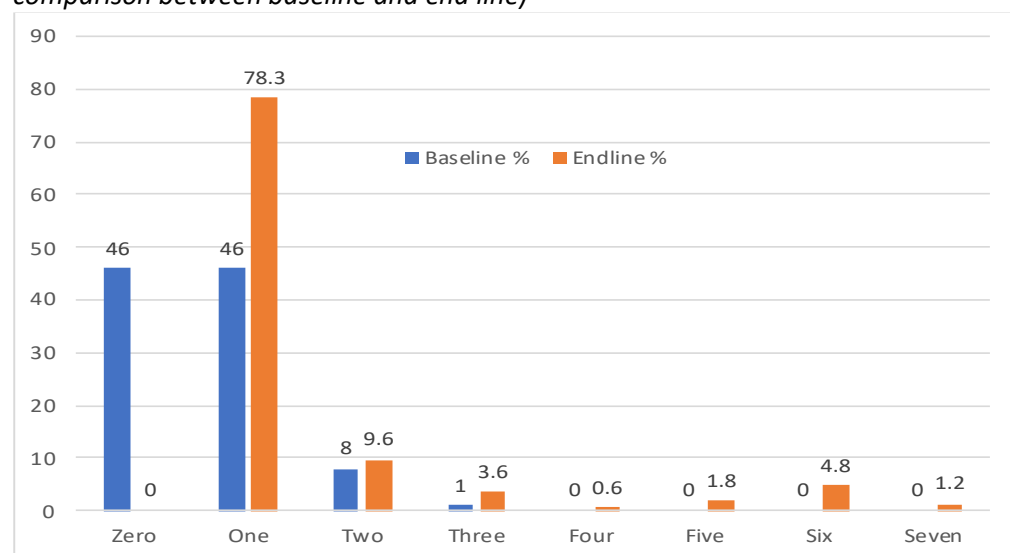
Out of eight types of SA agricultural technique, the adoption pattern among agriculture households shows increased during the end line. When conducting the baseline, about half of the respondents did not apply any of the SA techniques. But during the end line there are no one who apply none of the SA techniques promoted by the project. Likewise, the figure for those adopted at least one during the baseline, which was about another half increased nearly two-fold to 78.3% showing more people adopt at least one practice due to project promotion. In a similar way, a slight increase in proportion of people who adopt more than one (two to three) techniques has seen during the end line study. For adoption of more than three techniques, while none of the respondent from baseline behaved such practice a few numbers of respondents show started the adoption during the end line survey. (See the figure 8 below) Among those who did not apply the technique, they expressed their interest and aware about the benefits of applying them and commit to apply in upcoming years.

'We did not apply the technique because when we received the training, it was a bit late to apply in this year. We believe that this will help productivity of our crops. So, we will

apply the technique in next year for sure' a farmer respondent reported.

The similar responses were heard among FGDs and KIIs with different respondent groups from different villages reflecting that though the utility of the trainings is likely high, the delayed in timing of training provision meant that there was a delayed in application of techniques during the project's short lifespan.

Figure 8: Proportion of respondents showing application pattern of SA techniques (a comparison between baseline and end line)



For the main crops, farmers mainly rely on only one source of seed input (95%) of which the majority of them, i.e more than half (62%) for first main crop and half (50.8%) for the second main crop, rely on their seed for the next farming season. About one third of farmers who grow the first and second crops also get seed from other farmers. In addition, the pattern of seed bought from TAO or other agriculture input sources shows 29.3% for second main crop and 16.3% for the first main crop. (See the table 4 below)

Table 4: Sources of seed for household farming

Where did your household get seed for your first main crop	First Main Crop	First Main Crop %	Second Main Crop	Second Main Crop %
Buy for other farmers	44	26.5	40	32.5
But for agriculture input/TAO	27	16.3	36	29.3
Own Seed	103	62	62	50.8

Outcome 2: Increased smallholder farmers' production levels and income through improved access to markets, financial services and water

2.1. Percentage of members of FIGs increased agricultural production from SA practices

When exploring the membership of the sampled household in different committees, groups and associations in village, the involvement of HHs into Farmer Interest Groups (FIGs) shows only 8.4% (n14). Among those who involved in FIGs, 86% of them reported as increased agriculture productivity for the first main crop. This figure is significantly higher than the baseline figure of 30% reflecting the outcomes of applying SA techniques on crop productivity during the project period. Among those who

involve in FIGs (n14), 71% reported that they received technical information from FIG, and about half receive support related to tools and materials. About one-third each said the FIG provides market information, provide financial support and do collective activities through FIGs. However, this increase in productivity among FIG members and the outcomes are difficult to interpret statistically given limited number of respondents among that group (n14). This requires an in-depth analysis on the issue. Interestingly, no one from WHH+SFHH households involve into FIG activities.

2.2. Percentage of targeted HH have increased income from SA practices

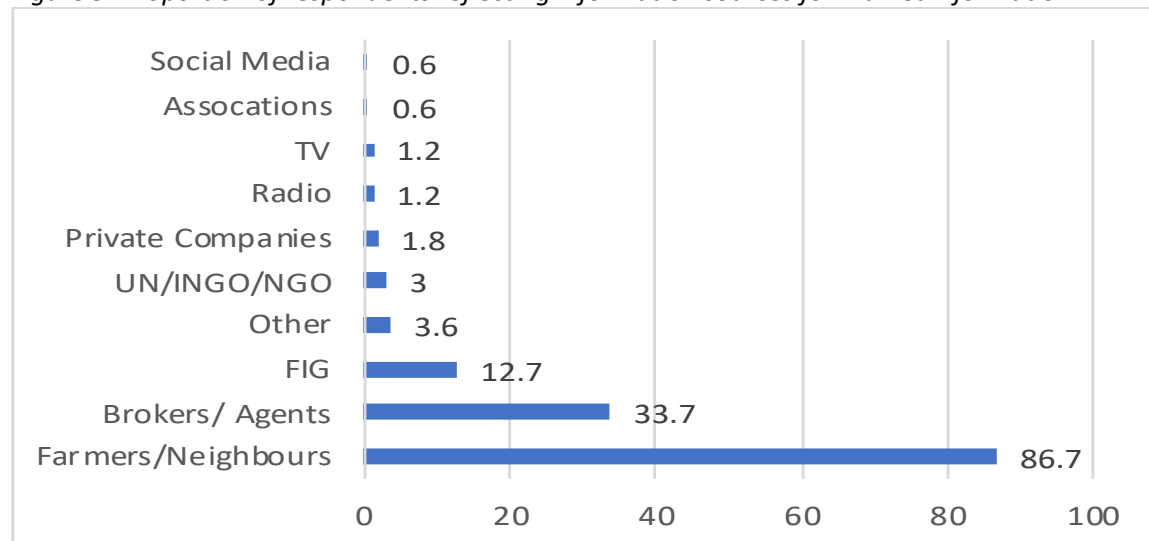
The average amount of income for the last 12 months from the first main crop was 326,446 MMK (range from 0 income to 9,000,000 MMK), while for the second main crop, the annual income presents 157,870 MMK. This results the average total income from both main crops (first and second crops) as 667,392 MMK which is 179072 Ks higher than the baseline income of 488,319 MMK from crop selling. When making a detail analysis of household income by using yield as a proxy indicator—as it was done during the baseline—the increase in yield/income has reported among 64% of those who adopted 2 or more SA techniques introduced by project (n 36) which is 10.7%% higher than the baseline figure. It was followed by the proportion of people reported the same level of income as the last year (22%) and decreased income (14%).

2.3. Percentage of targeted HH increased awareness of market agricultural produce

Among first crop growers, almost half (48%) sell their product for their income, while the rest mainly rely the product for household consumption. Among people who sold their first crop, more than half (59%) did it individually, whereas about one fifth each sold either collectively or applying both methods. In selling the products, people mainly rely on brokers (more than half rely on village-based brokers and about 35% rely on town-based ones). For the second crop, 39.2% of the growers sold their products. In doing so they sell mainly to the town-based brokers (67%) followed by selling to village-based brokers (33.8%).

Regarding the market information about marketable agriculture produces, the majority of the respondents (86.7%) relied on farmers/ neighbors, while about one-third rely on brokers/ agents and about one-tenth (12.7%) on Farmer Interest Groups (FIGs). Other sources such as TV, Radio, private companies and development agencies represent less than 5% each and present as relying less by the respondents.(See the figure 9 below) This FIG figure reflects similar figure as presented during the baseline (13%) and it reflects that the project interventions related to promotion of market information still needs to be strengthened more in similar future projects.

Figure 9: Proportion of respondents reflecting information sources for market information

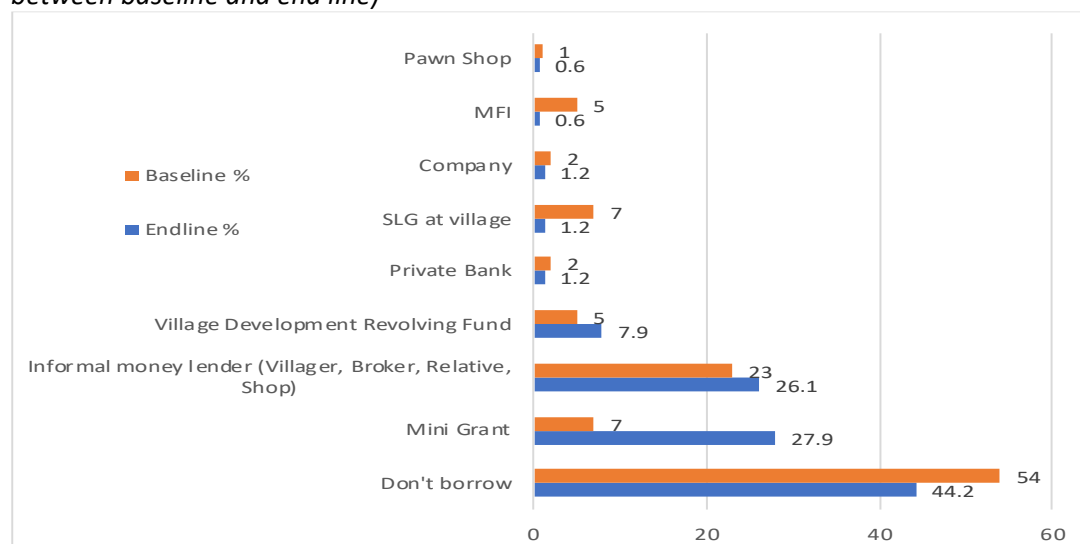


2.4. Percentage of targeted HH used financial services

About half of the households (44%) did not borrow money for the agriculture purpose, whereas about a quarter each took money from either mini grant or informal money lenders such as villager, brokers, and relatives over the last year. The most commonly cited saving and loan group among all interview respondents (in both FGDs and KIIs) is Wone Metta with the average interest rate of 2%. The money lending from other sources such as village development revolving fund (VDRF), private bank, other companies, Pawn shop, etc. for agriculture purpose accounts for less than 10% and present as the less common sources for borrowing money. In addition, based on the interviews with the community members, the respondents also reported the access to CARE’s initiated loans with lower interest rate of (1%). However, the accessibility to CARE’s small loan is limited due to high demand among the village community.

Though the pattern of borrowing the sources looks similar to the baseline, upon making a closer comparison, during end line, there are 10% less of respondents borrowing money from any sources (54% to 44%) showing a slight increase in self-sufficient among the respondents during the end line. In addition, those who took money from mini grants accounts four times increased than the baseline figure of 7% to 27.9% in end line. The rest of the sources show similar pattern of uptake across the two-time spans. (See the figure 10 below)

Figure 10: Proportion of Households reporting money borrowing pattern and sources (a comparison between baseline and end line)



The interest rate during the end line ranged from one to seven percent per month with an average of 2.3 percent (SD. 1.88) across the whole community. The reported average interest rate during the baseline was three percent, so that the figure reflects slightly more reasonable than the baseline. The interest rates among different sources reflect differently, where, mini grants show relatively higher average interest (2.8%), in contrast, informal money lenders and VDRF show 0.8% in average. However, given accessibility and availability issues—the accessibility question to formal loan sources such as MFI/SLF/MADB account only 15.7% (only 26 out of 166 loan takers)—, it looks like people tend to rely more on Mini grants.

In terms of average loan size, the respondents took about 189,590 MMK (SD 296516) with a maximum size of 1,600,000 MMK. Among different respondent groups, SFHH and both WHH+SFHH took relatively larger loan size of 213860 MMK and 150000 MMK respectively during the last 12 months. The WHH took an average size of 114710 in the last year. Again, more WHHs look like accessing to formal loan sources compared with the other two groups (25% Vs 13/12% respectively)

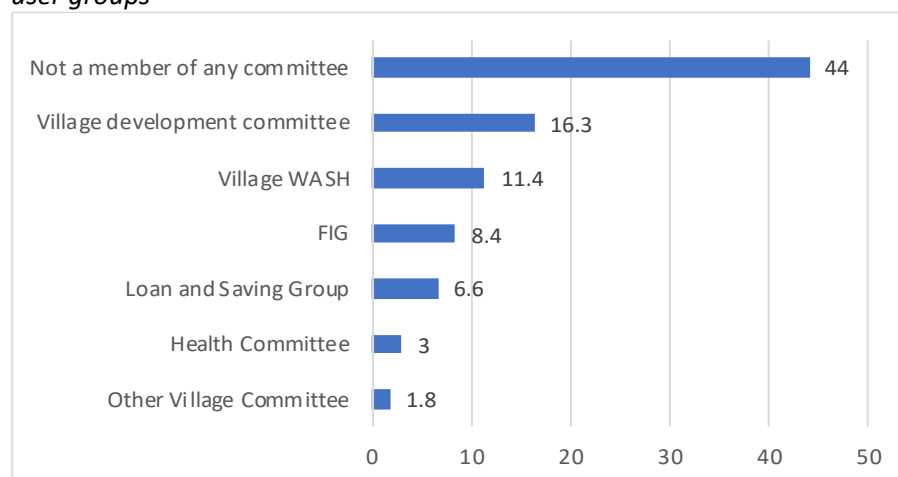
In terms of saving practice, more than half of the households does not have saving practice, while the rest (40%) save money from their income. This reflects the baseline interpretation on saving practice of ‘many respondents had no saving practice’.

2.5. Numbers of water system management plan (develop and implemented)

When exploring the membership of the sampled household in different committees, groups and associations in village, almost half (44%, n73) responded as no involvement in any of the committees. Among those involved in any of the groups, 16% (n27) involve in village development committees, which is then followed by village WASH committee (11.4%, n19) and Farmer Interest Groups (8.4%, n14). The involvement rates in other groups such as loan and saving group, health committee and other committees reflect less than or equal to 7% each. (see the figure 11 below)

Therefore, the village water committee (11.4%) is group that received the second highest membership among all village-based committees and groups. The membership figure into WASH committee is slightly higher during the end line compared with the baseline figure of 8.7% highlighting the benefit of mobilization effort by project WASH interventions. From community interviews, the WASH committee mainly plays an important role in maintenance of water system (e.g. repair of pipelines from destruction caused by cattle) and maintain the function of water systems. In some villages, the community provides monthly contribution of small amount (app. 500 Ks/ month) to reserve funding for water system maintenance.

Figure 11: Proportion presenting respondents’ involvement into different village-based committees and user groups



2.6. Percentage of participating HH increased access to water for home consumption

Unlike the baseline status where almost half of the households (46.2%) relied on surface water (e.g. river, stream, dam, lake, pond, canal, or irrigation channel), the end line figure shows a significant decline in relying upon that water source (15.7% = 3 times lesser than the baseline). Instead, the majority of the households (about one-fourth each) rely more on public tap/standpipe, tube well/borehole and piped in the dwellings. The reliance on tanker trucks, which showed one-fourth during the baseline also dropped 4 times (7.2%) during end line. The use of other water sources for drinking purpose ranges from 1-14% each. (See the table 5 below)

Table 5: Water use pattern for drinking purpose across different water sources

Sources of drinking Water	Frequency	Percent
Public tap/standpipe	41	24.7
Tubewell/borehole	41	24.7

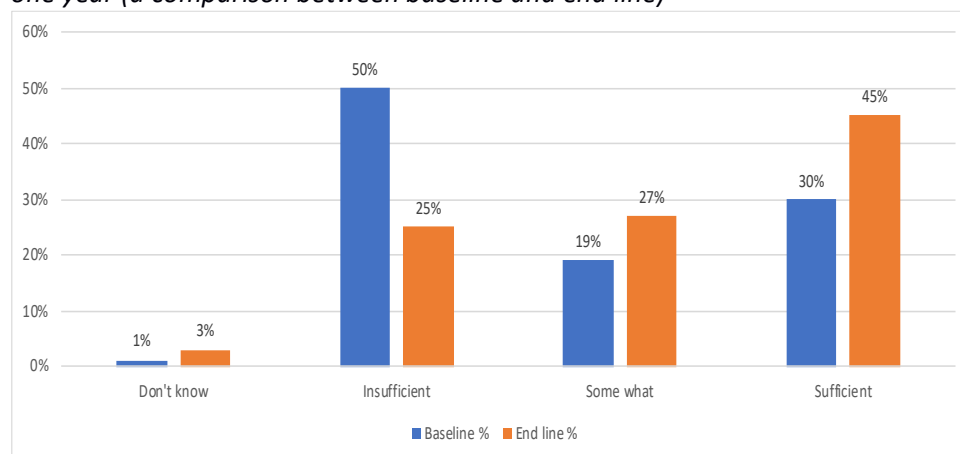
Piped into dwelling	34	20.5
Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	26	15.7
Protected well	23	13.9
Other	16	9.6
Rainwater	13	7.8
Tanker-truck	12	7.2
Unprotected spring	9	5.4
Unprotected well	5	3
Piped into yard or plot	3	1.8
Protected spring	3	1.8
Cart with small tank/drum	0	0
Bottled water	0	0

The people mainly walk to fetch water (87%) followed by small proportions of respondents to other fetching modes such as using motorbikes (3.6%), carts (2.4%), etc. For average water-fetching time during the summer, it accounts for 11.48 min, (SD 12.8, min 0- max 60 min). While about three quarter of the HHs during the baseline reported lack of water shortage year-round, the figure decreased to about half (54.2%) during the baseline. Likewise, while 25% of the baseline HHs reported as facing water shortage problem during the last hot season, more respondents from the end line (50%= a double increased than the baseline) reported the same, reflecting that the community faced a water shortage issue within one year prior to end line study.

2.7. Percentage of participating HH increased access to water for agriculture

For the first main crops, the vast majority of the households (90.4%) relied on rainwater for agriculture purpose, while about one-fifth additionally use surface water and irrigated water for watering their crops. Likewise, the majority (94.4%) of the second crop growers, rely on rainwater, which is then followed by river and stream water (10.5%), irrigation (2.4%) and ground water (1.6%). While less than one third (31%) of the baseline respondents answered that the water was sufficient for crops in the last 12 months, increased proportion of 45% responded as sufficient during the end line survey. In contrary, while half (50%) of the baseline respondent said water was insufficient for main crops, the figure during the end line drops to half (25%) of the baseline value, showing more water security for agriculture use. (See the figure 12 below) The water insufficiency is reported mainly among WHH+SFHH group compared with the other two groups (62% in WHH+SFHH Vs 25% SFHH alone and 17% WHH alone).

Figure 12: Proportion of Households reporting water sufficiency pattern for the first main crop in last one year (a comparison between baseline and end line)

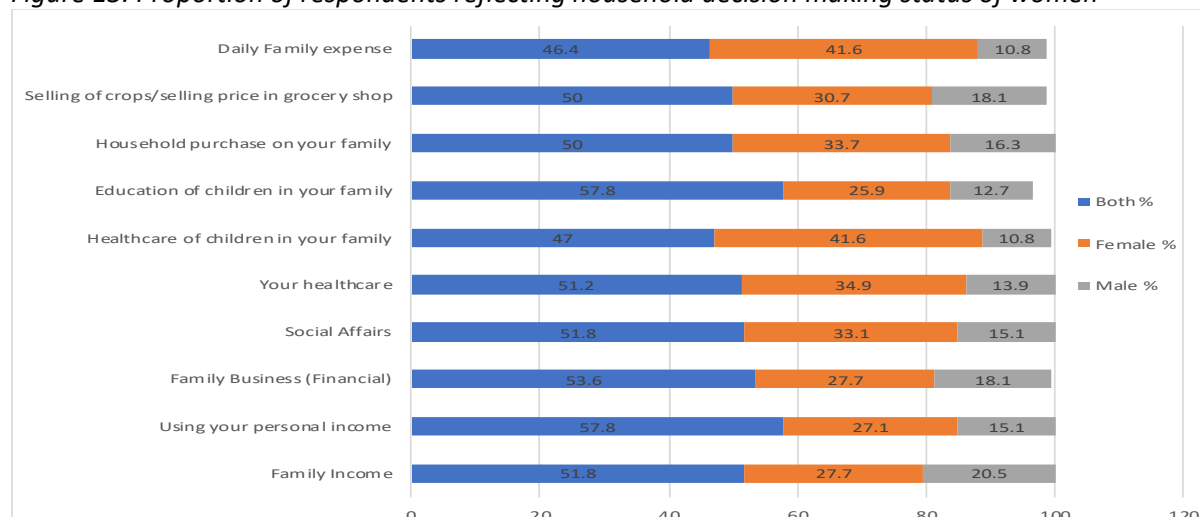


Outcome 3: Improved hygiene and nutritional outcomes through increasing women’s access, ownership and control of productive resources and sanitation facilities

3.1. Percentage of women reported they are able to equally participate in HH Financial decision-making

The baseline figure reported that when the project commenced, the role of women in making household financial decision-making alone was presented as lesser than half (41.6%), while 30.8% and 27.6% respectively reported that such decisions are made by male predominately or collectively with them. Due to project’s effort in women empowerment and promotion of women’s social positioning and household decision-making, the end line figure related to all aspects of household financial decision making including family expense (46.4%), selling of crops (50%), household purchase (50%), family business and finance (53.6%), managing personal income (57.8%) and family income management (51.8%), reflected that the figures related to decision making by women alone have shown increased compared with the average baseline figure. This collectively presents, higher women’s social positioning and decision-making power within their families. (See the figure 13 below)

Figure 13: Proportion of respondents reflecting household decision making status of women



3.2. Percentage of HH using recommended hygiene and nutrition practice

One-fourth of the respondents reported as sharing toilet with other households. Among different household groups, the toilet sharing pattern shows higher among WHH+SFHH group through presenting 37.5% of sharing response, while other two groups WHH along or SFHH alone present

sharing pattern of about one-fourth each. This again reflects the accessibility issue related to toilets among HHs facing double vulnerability.

In terms of types of toilet used by the respondents, like the figure presented during the baseline, almost all of the respondents (98.7%) used any form of pit latrine (either flush to pit, pit latrine without slab or open pit latrine, ventilated improved pit latrine), while only 1 HH from WHH+SFHH group reported without presence of toilet in their HH. Among pit latrine users, a large majority of them (86%) are using ventilated improved pit latrines (VIPs), an improved form of latrine promoted by the project. So that the figure increased more than three times (86% Vs 25%) from the baseline figure of about a quarter showing the effectiveness of project's hygiene promotion activities. The use of VIP is highest among WHHs (94%) followed by around 80% each in the rest two groups. Upon observation, the majority (89.8%) of the households, keep soap and water at the hand washing facilities and around three-fourth of the toilets are reported as fly-proof and shame-proof, while half are reported as smell-proof.

In terms of toilet hygiene and cleanliness, 60% said they clean their toilets at least four times in a month, while 30% clean 1-3 times in the stated timeframe. One-tenth of the respondent clean their toilet less than one time in a month presenting poor toilet hygiene among them. In general, while the proportion of people who wash their toilet 1-3 times in a month show relatively similar (about one third) among different household groups, about one-tenth each of HHs from SFHH and WHH+SFHH reported cleaning less than one in a month. About half of the SFHH group, wash their toilets at least four times in a month, while the rest two groups show higher response rate (>60%) to that question.

81% of the respondents undertook some kind of measures to make water safe before drinking. Among the different methods, boiling accounts for highest adoption pattern (80%), which is then followed by using filters (ceramic, sand, composite, etc.). Such practices show significantly positive when comparing with the baseline figures, for example, 30% increase in boiling practice then the baseline, 10 folds increase in practice of using water filters (6% in baseline to 60% in end line) and marked decreased in people who does not take any actions (baseline 8% to end line 1.5%). *(Please see the figure 14 below)* When conducting a detailed analysis, while 90% and 78% of WHH and SFHH are applying boiling method, the boiling for safe water drinking practice is seen in only about half (57%) of the WHH+SFHH households, presenting their affordability issue to utilize fuel for boiling. In contrast, the later group presents 100% use of filter for cleaning while the first two present about half among them.

Regarding the hand washing practice among the respondent, the majority of them correctly cite the major instances for washing hands. Among these instances, more than three-fourth to nearly all of the respondents that hand washing is needed before cooking (78.3%) and eating food (88.6%), and after going to toilet (94). Another half reported the importance of washing hand after handling the dirty things and animals. Comparing with the baseline figure, the practice of hand washing after toilet show significantly increased (from 53% to 94%) and likewise, other important instances for hand washing such as before eating, before cooking, after handling animals or dirty things all shows better hygienic practices during the end line compared with the baseline. The improvement in hand washing practice has reported as beneficial among the FGD respondents as the major preventive measure against COVID-19 infection. However, hygienic feeding of children and hygienic handling of children's poo, the end line responses show increased than the baseline (7 to 12 times increased from 3-5% to 38%), but the end line figure still presents lower as it still accounts for 38% each. *(See the figure 15 below)* It is especially lower among WHH and SFHH (both presenting nearly 40%) than WHH+SFHH (50%).

Figure 14: Proportion of households reporting the use of different water cleaning methods for safer

drinking (a comparison between baseline and end line)

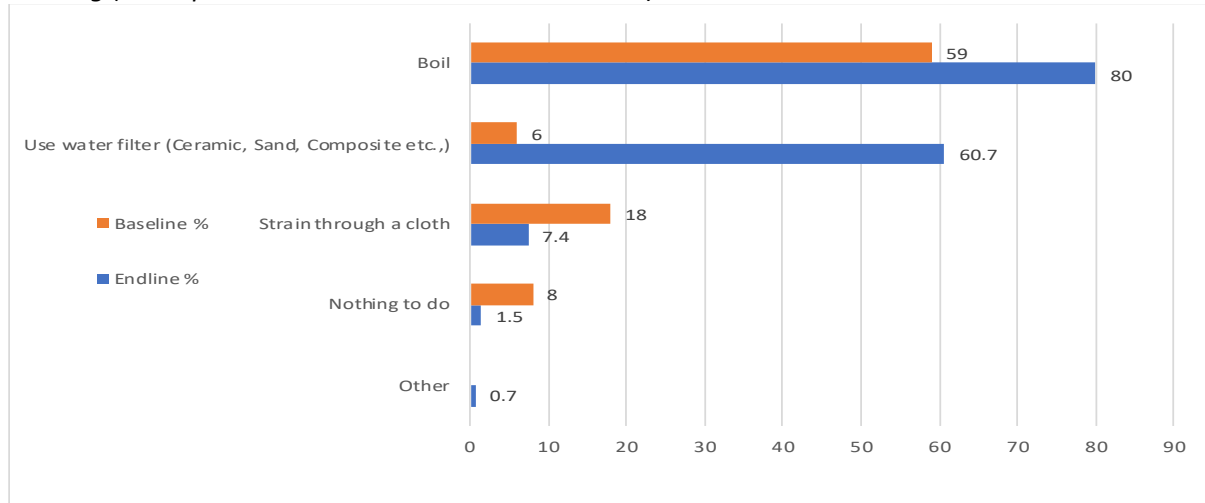
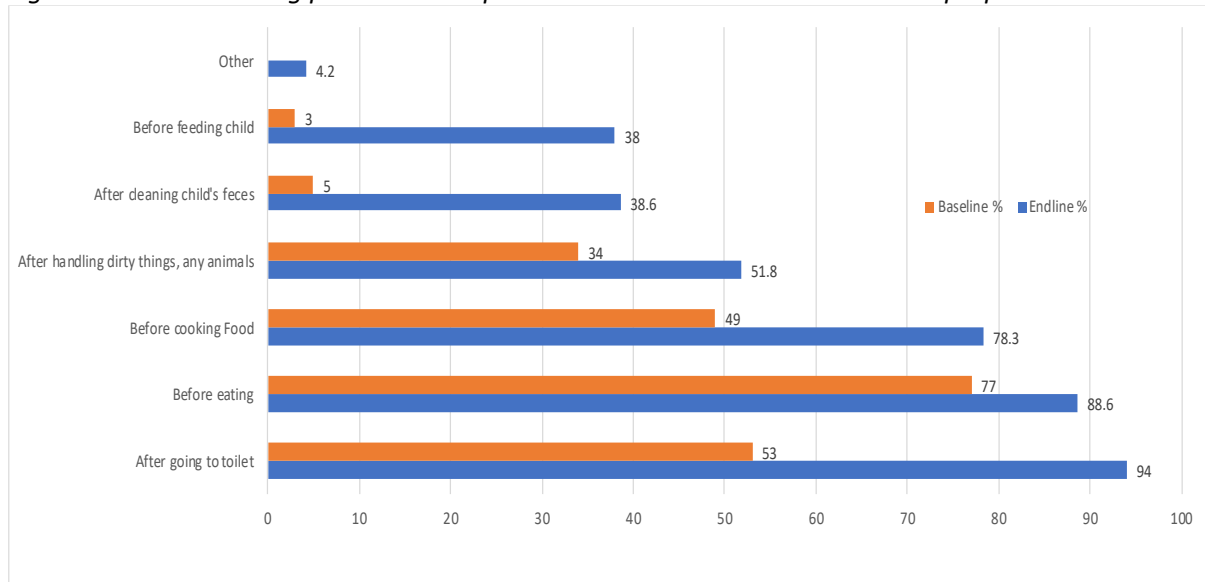


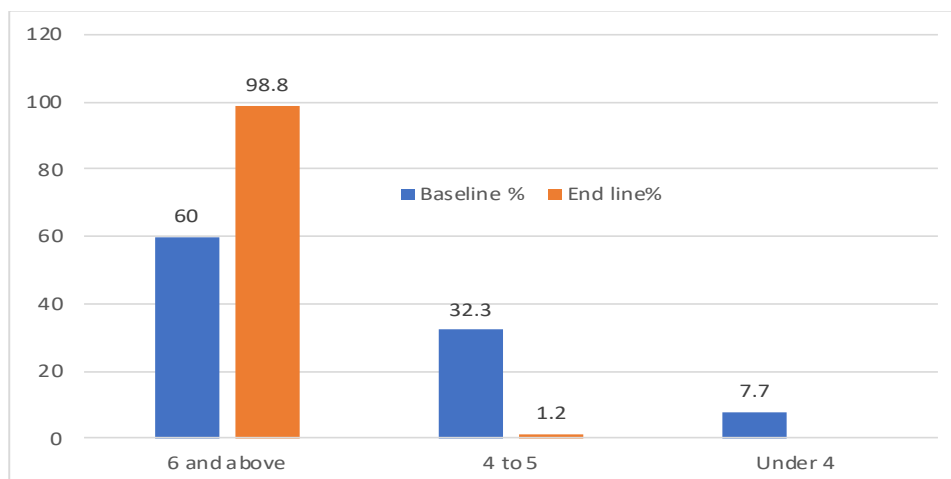
Figure 15: Hand washing practice a comparison between baseline and end line proportions



3.3. Percentage of HH increase in diary diversity score

To obtain a well-balanced nutritious food, it is necessary to eat a variety of food categories. The calculation the diversity of food score for each HH was based on the total 12 food items that the households ate within 24 hours. While the baseline figure presented an average HDDS of 6.25, the end line presents significantly higher overall score of 10.08 reflecting more diverse dietary patten among the target community. When conducting a detailed analysis comparing between groups, the similar average score of above 10 (range from 10.06 to 10.50) is seen among WHH, SFHH and both WHH+SFHH groups. During the baseline, while slightly more than half (60%) reported as getting score 6 and above, the end line figure for that category increased to almost all respondents (98.8%). Likewise, while the baseline presented about one third of respondents who are fallen under HDDS between 4 to 5, only 1.2% of the remaining respondents answered so during the end line. In contrast, the proportion getting under 4, that accounted 7.7% during the baseline presents none during the end line echoing the same interpretation of 'higher nutritional knowledge and practice' due to the project's promotion. (See the figure 16 below)

Figure 16: Household Dietary Diversity Score comparison between baseline and end line proportions



3.4. Dietary diverse score for infant and young children

To estimate the dietary diversity of infant and young children, it is necessary to know about the eight food items and feeding times of 6- 23 months old children within 24 hours. It is defined as less than four items is insufficient and more than three items is sufficient. Upon calculation of the average score, the end line figure reflects 7.38 (SD 1.55). In making detailed analysis, the score looks higher among WHH and WHH+SFHH (both present 8) compared with the SFHH alone (7.1) reflecting the effectiveness of nutrition knowledge promotion activities for children and its outcomes among women. In making comparison against the baseline figure, that shows the insufficiency in children's food sources were found as about half of the respondents having young children, the baseline figure decreased to 5% (about 8 times reduced in dietary insufficiency rate among infants and young children), while the proportion of households reported as having score 5 and above show 94.6%. This presents satisfactory outcomes reflecting the success of nutrition interventions promoted by the project.

3.5. Percentage of HH decreased in diarrhea cases in targeted community at end of project

The simple 'four cleans' measures such as clean food, clean water, clean hand, and clean latrine can prevent of diarrhea occurrence among children and adult. Comparing with the baseline figure, which reported 15.9% of diarrhea occurrence within the past two weeks of survey, the end line figure shows a decline of 10.3% cases. The disease pattern among under five years old child shows a significant decline from 30% during the baseline to 6% only (five times decreased) during the end line reflecting better awareness and hygienic behaviour adopted among care givers of children. However, the pattern of disease occurrence shows the same among those above five years which present about half of the respondents each in both baseline and end line. On detailed analysis the proportion of diarrhea occurrence is reported as lowest among SFHH (8%) compared with the relatively higher proportional figures among WHH (6%) and both SFHH and WHH (25%), that signifies the importance of providing ongoing support to those vulnerable groups in the community.

Conclusions and Analysis of Key Issues

Though the project only lasts for about one and half year timeframe, between 2019 to 2020, the Scaling Up Sustainable Agriculture (SSA) project contributes a lot of positive outcomes in various aspects of its interventions among 13 vulnerable villages in Lasio, Northern Shan State.

In general, the project contributed largely to changes in behavior related to the adoption of new agriculture practices, leading to increased production and a slight increase in income. It also reflects that the people showed slightly lower reliance on loans for their financial issues. Moreover, for the outcomes related to accessibility to water—for drinking, household use and agriculture purpose—,

year-round access to water, water treatment methods for drinking, handwashing practices, these all have shown significant improvements compared with the baseline figures. In addition, it helps people better access improved forms of toilets and promote hygienic and nutrition practices including nutritional diversity and exclusive breastfeeding, etc. The project also promoted women's decision-making roles and enhanced their social positioning status among the households.

Regarding the *agriculture techniques* promoted by the project, in both first and second crops, the adoption of techniques showed significantly high during the end line, in contrast, no adoption rate drops from about half during the baseline to only 3% during the end-line. The figure for those who adopted at least one technique increased nearly two-fold from baseline than the end line reflecting more people are adopting at least one technique as promoted by the project. These changes in adoption patterns helped farmers to increase the *yield* of their crops. A double increase in yield of the first crop is seen during the end line compared with the baseline. Likewise, a higher *income* pattern among the respondents is seen in the end line compared with the baseline (667,392 MMK in end line Vs 488,319 MMK in the baseline). For getting *seeds* for farming, farmers mainly rely on their own seed for the next season presenting self-sufficiency in the area. Among people who were involved in *FIGs*, 86% of them reported an increase in yield of their crops (50% higher than the baseline value).

Reflecting the increase in income among the respondents, 10% less of the respondents in end-line survey relied on *borrowing* money compared with the baseline showing a slight increase in financial self-sufficiency among the end line respondents. Among those, who took the loans, they mainly took them from mini-grants and less relying on formal loan sources due to accessibility issues. Again, the majority of the people do not have a *saving practice* which is relatively the same as the saving pattern during the baseline.

Regarding the *water sources* for use, the majority of the household access to improved sources such as public tap/standpipe, tube well/borehole, and piped in the dwellings, which in comparison with the baseline—where about half relied on surface water—showed significant improvement. Likewise, the accessibility and sufficiency of water for agriculture purposes also showed an increased from 31% to 45% between the baseline to end-line. The pattern of accessibility to the year-round water also reflects higher accessibility during the end-line compared with the baseline (54% Vs 30%).

Regarding the *hygienic use of water and safe methods for drinking*, the end line figures present a higher proportion of people adopting boiling before drinking and using a water filter for cleaning purposes. The figures also reflect that there is a marked decrease in people who do not apply any cleaning methods before drinking (8% in baseline to 1.5% in end line). Similarly, in terms of *the hand washing*, hand washing pattern after using toilet show significantly increased as it does in other important instances such as before eating, before cooking, after handling animals or dirty things all show better hygienic practices during the end line compared with the baseline.

Despite an increase in positive behavior regarding safe water drinking through boiling, such practice only reflects among half of WHH+SFHH families, signifying the importance of strengthening the reach of benefits to those who are relatively more vulnerable among the community. Moreover, though, the overall figures on *hygienic feeding of children and hygienic handling of children's poo* reflect better than the baseline, but the end line figure still presents low as it still accounts for 38% each.

For *latrines*, a large majority of the respondents presented as using ventilated improved pit latrines (VIPs) promoted by the project. The VIP use increased more than three times compared with the baseline figure, again reflecting the effectiveness of the project's latrine promotion activities. In terms of toilet hygiene and cleanliness, more than half clean their toilets at least four times in a month and about one-third clean 1-3 times in the stated timeframe. These resulted in a decline in diarrhea

occurrence among respondent households (especially among under-five children) during the end line compared with the baseline. Regardless of an increase in the general patterns of accessibility to and cleanliness on the toilet, the toilet sharing data still shows higher among WHH+SFHH group, which reflects the toilet accessibility issue among these communities.

In terms of the *self-sufficiency of the food*, while only one-fourth of the baseline community reported that they could rely on their own products on major food items, the figure increased to about half during the end-line, presenting the high level of self-sufficiency in food production. The majority of the HHs grow *home garden* and grow vegetables such as mustard, eggplant, chili/pepper long bean and tomato. While almost all the home garden growers grew mustard, about three quarter each grew eggplant and Chili/pepper respectively. For long bean, it was grown by about half of the respondents. This also helps the respondents getting diverse food-variety from their own production.

Upon reflecting the *household dietary diversity score (HDDS)*, while the baseline figure presented an average of 6.25, the end line presents significantly higher (10.08), reflecting more diverse dietary patterns among the target community. The proportion of people getting scores 6 and above (diverse food groups) increased from 60% during the baseline to 98.8% during the end-line. Again, the nutritional *dietary diversity of infants and children* showed a significant improvement during the end line survey (especially among both WHH and WHH+FSHH). For example, while the proportion of HHs presenting insufficiency in children's food sources showed about half of the respondents, the figure dropped eight folds during the end-line. Both highlighted the effectiveness of nutrition knowledge and behavioural promotion interventions among the target communities.

When comparing *women's decision-making level* between end-line and the baseline, the figures related to making independent decisions by women alone have shown increased compared with the average baseline figure. This presents, the outcome contributed by the project in promoting higher women's social positioning and decision-making within their families.

Though many of the outcomes have shown improvements when comparing with the baseline, many intervention areas—for example, the adoption of agriculture techniques, key nutritional and hygiene practices and diversity of livelihood opportunities and incomes—still show very high potential for further improvements and to achieve sustainable and long-lasting outcomes. In addition, upon making a detailed look at some outcome variables, it shows some *areas for further improvement* in the current project. These are ...

- Though, there is an increase in the adoption pattern of techniques promoted by the project, the variety of adoption is still limited, and it reflects the need for further promotion and provision of support to maximize the impact and for achieving sustainable agriculture outcomes.

'The farmers still have wrong practices in soil preparation, the use of organic and chemical fertilizers and pesticide, those lead to soil erosion and affect the productivity. We educate them in collaboration with different organizations.' the DOA official comments. He also highlighted the importance of quality inputs and storage facilities as important assets for successful agriculture business.

In addition, many respondents from KIIs and FGDs reported lack of application of techniques due to delayed in getting the trainings.

- Despite a slight increase in income as well as a reduction in borrowing, the general pattern of the income increases and reliance on external financial sources still poses very high among

the respondents. Especially, among the HHs that are facing double burden (WHH+SFHH), these still present lower income compared with the rest of the two groups (though their income showed slightly higher than the baseline). In addition, the saving practice among the community is very weak and many villages conducted FGDs reported as not having village saving and loan groups.

- When dealing with project promoted community-based organizations, though there is a slight increase in the involvement of people into these groups such as FIGs and WASH committees during end line, a general participation level showed less significance by seeing that almost half of the respondents do not involve in any of the groups yet. Especially, there is a lack of involvement of more vulnerable HHs (WHH+SFHHs) into FIGs.
- Though the average trends of outcomes during the end line show positive among the whole survey respondents, there is a slight variation in the distribution of results among different groups depending on the vulnerability. For example, for the HHs under the double vulnerable category (both WHH+SFHH), they showed a lower level of income, lower latrine ownership, and changes in some hygiene behaviors, and a lower level of participation on the village-based organizations.

However, given improvements against the baseline in all aspects, there is a very high potential for the project to attain its highest potential—including achievement of inclusive and equitable benefits to the community— if there is any valuable opportunity to continue the project through an extension. In addition, the participation level, function and capacity of the community-based organizations promoted by the project requires providing ongoing support and strengthening to achieve sustainable changes and development in the community. These factors highlight not only as limitations of the project implementation but also serve as the window opportunity to achieve sustainable development outcomes among the target community.

Recommendations

By reflecting the overall achievements as well as key issues to be addressed as discussed above, the end line assessment provides the following recommendations to inform upcoming projects (extension project in the same area or similar projects elsewhere) ...

1. It is highly suggestive of doing project extension in the area along with adding tailored interventions for the most vulnerable people in the community.
2. To promote diversity in the adoption of the sustainable and climate smart agriculture techniques through FIGs. In doing so, it is not only important to promote the techniques, but also to provide the required inputs of good quality including farming machines such as tractors (at least at the collective level in villages) for effective results and benefits (yield, incomes, etc.). Again, as highlighted earlier, it is important to provide the trainings at the right time prior to farming season to promote adoption.
3. To promote the sustainable mechanism of technical transfer such as getting support from government department such as the Department of Agriculture (DOA), as well as through promoting peer-to-peer learning between farmers via the strengthening of FIGs.
4. To promote saving practices among the community (especially among women HHs) through establishing, strengthening and promoting Village Saving and Loan Groups (VSLAs) through incorporating learning from other similar CARE's projects such as VSLA and women empowerment interventions in Kayah.

5. To strengthen roles of FIGs to be more technical and user-oriented through strengthening and integrating comprehensive functions such as technical transfer and extension, accessibility to collective seed sources (e.g. seed bank), effective provision of market information and networking with external buyers, supporting access to agriculture loans, and exploring alternative market opportunities through contract farming, etc. In addition, it is suggestive of promoting connections between FIGs and relevant stakeholders including government and other agriculture service providers (private and other development actors).
6. To strengthen the structure, capacity and functions of community-based groups to be more inclusive and effective. In terms of strengthening the capacity, it requires to address not only the technical aspect, but also the organizational aspect to promote leadership and management capacity, to strengthen accountability mechanisms and systems, and to promote community mobilization skills for sustainable functions. In addition, formation and strengthening of newer functional groups such as 'female transplanters association' (as suggested by the DoA official) should be promoted.
7. To promote women's roles and social positioning at the village and wider community level through empowering them, equipping relevant skills, providing space for them to engage each other and work together (e.g. through VSLA).
8. To explore the root causes of food insufficiency in some months during the reporting period and to identify solutions and interventions to address food security issues in the area through conducting a qualitative in-depth study in the target villages.
9. To provide tailored livelihood and income generation support to vulnerable HHs to achieve livelihood diversification through incorporating and strengthening market and value-oriented interventions and introduction of relevant livelihood options. These including the provision of relevant technical skills, inputs, and assets, providing initial investment support, support access to market, etc.